

## KING ISLAND WEATHER:

## SEASONAL ABNORMALITIES IN SOUTHERN AUSTRALIA.

By C. RICHARDSON.

[Reprinted from "The Mercury," Hobart, Tasmania, Oct. 19, 1918.]

From January 1 to August 31 in the present year the local rainfall was 26.83 inches. In the same period last year 29 inches were recorded.

Of course, the practical views of seasons taken by farmers or others whose avocations are influenced to a great extent by the weather is almost wholly confined to one factor—the total quantity of rainfall for a season or a year. Although it would certainly seem a very practical way, nothing, however, could be more deceptive or misleading. Ten inches of rain in a normal season is far more satisfactory than 20 inches in an abnormal season. \* \* \* In normal winter seasons in these latitudes there is an almost continuous belt of rainy and stormy conditions, having a mean or average drift (sailors' word) from west to east. In this belt "whirls" or storms of cyclonic formation occur. The dimensions of such disturbances vary. Their approach from the westward is first indicated by northeasterly to north winds, and as the atmospheric "trough" approaches so the mercury descends the barometer tube. The trough contains most of the rain, hail, etc. After the passage of the "center" over any point of observation in its track the winds become SW. to S.; and finally SE. winds extend a considerable distance to the westward, and fine weather prevails for a time. Upon occasions when these cyclonic disturbances cover a comparatively small area the "drift" weather follows closely in their wake. Not infrequently its elements pass eastward in the middle stratum of atmosphere or, in other words, overlap the rear winds of the preceding disturbance; hence the observation of clouds traveling eastward and westward simultaneously. A few years ago these separate disturbances followed one another for some time about every five or six days. They were really troughs traveling eastward within pressure gradients, often described as a trough of atmosphere.

In the present year the comparatively less rainfall in this locality was \* \* \* [associated with] a bank of atmosphere that maintained itself with marked persistency for an exceptionally lengthy period. Its position was approximately from NW. to SE. The [apparent] effect of such a bank or long range of high pressure was to ward off or deflect the elements coming from the westward, hence the smaller quantity of rainfall in King Island. The position of this bank of high pressure in a normal winter is approximately west-east, and as a consequence the march of the weather in such seasons is approximately in a similar direction when directional variations due to thermal effects are eliminated in the calculations.

The departure from normal conditions is when the bank in question takes up an approximately NW.-SE. position. The effects of the alteration are very noticeable not only in the season in which the phenomenon occurs, but also in the succeeding seasons up to the end of autumn, which may aptly be described as "the end of the meteorological year."

The belt of rain and gales in the Southern Ocean is popularly known as the "Roaring Forties" on account of its being on the average confined to the 40° latitude. When this belt maintains a regular march from west

to east, Victoria, King Island and Tasmania enjoy a normal winter and spring season, but from one cause or another the belt does not always traverse such [a] course. In some winters, and for a number of winters in approximate succession, it appears to curve northward somewhere to the eastward of St. Paul's Island.

The detour invariably causes a [strong] east wind \* \* \*. During these operations fine weather prevails in Victoria, Bass Strait, and Tasmania. Upon some occasions the belt maintains its continuity, and regains its easterly by passing over the SW. portion of West Australia in a NW.-SE. direction. Upon other occasions the belt is severed in the extension. The curvature subsequently appears to be represented by the lay of a high-pressure bank lying approximately NW.-SE. In places pressure in the bank varies, and as a consequence the elements of the belt [apparently] take advantage of the opening to regain their easterly. The position and stability of the bank of high pressure has a very important bearing on the climate of Australia. A majority of the NW. winds at Cape Leeuwin during the winter months is reliable evidence of one of the effects of a curvature of the Southern Ocean rain belt.

Another feature as the result of the curvature is that separate, or cyclonic, disturbances traverse a similar course, and as a consequence carry with them a considerable amount of comparatively high temperature \* \* \*

As to what is the actual or primary cause of these curvatures is not of very great importance, seeing that they can not be prevented by man, but in view of their close relation to drought or droughty conditions in the Commonwealth an extensive, systematic, and whole-hearted investigation of the phenomenon may be the means of enabling the Commonwealth meteorologist to gain a better knowledge of what transpires in the South Indian and Indian Ocean. \* \* \*

## ADDITIONAL NOTE.

[Dated: Currie, King Island, Tasmania, Oct. 31, 1918.]

I may mention that locally in discussing the seasons, or rainfall, in years in which the curvatures [of the path usually followed by cyclones] occur, the words "dumb-bell years" are used, which means that the rainfall resembles the same [when represented graphically by successive parallel lines the lengths of which are proportional to the amounts of rain each day, and the centers of which are on the same straight line]. In other words the rainfall from the commencement of autumn is normal, then a comparatively mild winter follows, the latter portion of August is mild, and September even quite summary, following which about eight weeks of wintry conditions prevail. In the latter, temperature appears to keep the cloud at an altitude that deprives us of the *quantity* of rain we would get if the resumption of the eastward march were from a point further south of NW. or WNW., or on a west-east course.

I have recently read an interesting manuscript article on the subject of rainfall, written by an old Antarctic whaler, in which he attributes variation of rainfall in Australia and Tasmania to extension of icebergs, the latter being depicted in his diagram as being carried northward, or toward the South Indian Ocean, by a polar current. The course of the current and extension

coincidentally correspond to the curvature \* \* \* [of cyclone paths referred to previously.] \* \* \* I had nine years study of it [in looking over the logs of eastward-bound vessels].

These "dumb-bell winters" are very provoking to the agriculturist on account of the mock spring they cause. People sow accordingly, and just about the time the plants are above the ground (late September or the first week of October) about eight weeks or two months wintry weather sets in, causing no end of trouble. Our politicians gape aghast when they see the cost of observing and recording "effects" (the money expended in trying to get at the cause or causes is infinitesimal) and as a consequence they have the Meteorological Department "set" as "useless," "farfical," "waste of money," etc.

Every year the wind vane at Cape Leeuwin lighthouse tells the Australian world its part of the story with the greatest reliability, but year after year it passes unheeded, not understood, etc. We here, on this bit of land, 40 by 16 [miles], take no interest in statistics of the past. However, is nothing deducible from those statistics? If not, where does the value come in?

What is needed in Australia is a solar observatory, and some of the thousands of pounds sterling that are spent annually in the compilation of data could be devoted with far greater benefit to the Australian people to such an observatory, for it is mainly by the existence or otherwise of the curvature I refer to that so many millions of Australian money are affected.

It seems absurd to think that the Government meteorologist in Melbourne can not inform the people early in June of such curvature when the masters of vessels tell him that their vessel emerged from a dense wall or mountain of coarse weather near St. Pauls and steamed for 8 to 10 days through an easterly gale in comparatively clear weather—what is that but the plainest evidence of the curvature of the usual belt northward—for the same masters visit King Island and they will find the same or similar conditions recorded? \* \* \* In years to come perhaps some one will succeed in getting at the cause of the variation [icebergs, solar variations?] and thus render a great service to thousands of helpless beings who are from time to time ruined by the effects of drought and broken winters too.—C. Richardson.

#### THE MARINE OBSERVER'S HANDBOOK.<sup>1</sup>

(Abstract.)

The second edition of The Marine Observer's Handbook, the standard work on marine meteorology, follows closely the lines of the first edition, issued in 1915. There is a foreword by Sir Napier Shaw, until recently director of the meteorological office, and a brief history of the office. Part I of the handbook is devoted to a description of the instruments and methods of observation required for keeping the meteorological record, or log. Part II deals with observations of wind, sea disturbance, clouds, weather and optical phenomena, including a comprehensive treatment of the subject of waves and swell. Part III comprises instructions for keeping the meteorological records. In the appendix are illustrations of cloud forms, with a graphic guide to their recognition, meteorological tables, instructions for transmitting weather reports from ships at sea by radio telegraphy, and

a list of publications, for the most part issued by the Meteorological Committee and its predecessors.—F. G. Tingley.

#### DEFINITIONS OF "MEAN," "AVERAGE," AND "NORMAL."

(Dictionary definitions and contributions from C. F. Marvin, A. J. Henry, H. C. Frankenfield, C. F. Talman, J. Warren Smith, P. C. Day, and Cl. Abbe, jr.)

Compiled by C. F. Brooks.

[Dated Washington, D. C., Jan. 4, 1919.]

Dictionaries make little or no distinction between the meanings of the three terms *mean*, *average*, and *normal*; yet in meteorological usage, *normal* has a meaning fairly distinct from *mean* or *average*. Let us consider prevailing definitions of each term; and attempt to arrive at some generalities which should govern the use of each in meteorological statistics.

#### MEAN.

In Webster's Dictionary<sup>1</sup> we find: "*Mean*. a. 4. *Math.* Average; having an intermediate value between two extremes, or between the several successive values of a variable quantity during one cycle of variation, such that were they all equal, the mean would be their common value. \* \* \* [As a noun]. Usually, unless otherwise specified, it is the one simple average (called arithmetical mean) formed by adding the quantities together in any order and dividing by their number." A more detailed discussion is to be found in the Century Dictionary and Cyclopedia (New York, 1911).

#### AVERAGE.

From Webster's Dictionary we have the following definition: "*Average*. n. 5. A mean proportion, medial sum, or quantity, made out of unequal sums or quantities; an arithmetical mean." Murray's Dictionary<sup>2</sup> says that an *average* is the distribution of the aggregate inequalities of a series of things among all members of the series, so as to equalize them and ascertain their common, or mean, quantity, etc., when so treated; the determination or statement of an arithmetical mean; a medial estimate. The Century Dictionary gives: "*Average* II a. 1. Equal in amount to the sum of all the particular quantities of the same sort divided by the number of them; as the average yield of wheat to the acre; the average price of anything for a year; hence 2. of medium character, quality, etc.; midway between extremes; ordinary."

#### AVERAGE AS DISTINGUISHED FROM MEAN.

Marriott in "Hints to Meteorological Observers" (6th ed., 1906) says that the arithmetical average or mean is the sum of all values forming the series of figures under consideration, divided by their number; and that *average* is the term used for results extending over a long period, while *mean* is used for short periods, e. g., a day, month, or year. Thus we might speak of the *mean* temperature of December, 1918, but of the *average* December temperature during the period, 1899–1918.

Dr. H. R. Mill, director of the British Rainfall organization, says (M. W. R., January, 1915, 43:42): "For convenience I use the term *mean* as indicating the sum of any

<sup>1</sup> 2d ed., Meteorological Office, London, 1918, 142 pp., 28 figs., 7 plates. Price 3s. 6d., net.

<sup>2</sup> Webster's New International Dictionary, Springfield, Mass., 1911.

<sup>3</sup> Sir James A. H. Murray, A New English Dictionary on Historical Principles, etc. Oxford, 1908.